Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-31. (canceled).

Claim 32. (currently amended): A system for optical information transmission having differently polarized optical signal elements, comprising:

a controllable polarizing element for emitting ~~at least one of~~ the optical signal elements on an output side; and

at least one signal processing module for detecting ~~any~~ polarization multiplex interference occurring between the optical signal elements, and for forming at least one control signal based on the detection for controlling the controllable polarizing element.

Claim 33. (previously presented): A system for optical information transmission as claimed in claim 32, further comprising, in the at least one signal processing module, at least one regulator having at least one input-side control signal at an input of the regulator, and at least one output-side control signal at an output of the regulator, the output-side control signal being passed by the regulator to the controllable polarizing element.

Claim 34. (previously presented): A system for optical information transmission as claimed in claim 32, further comprising, in the controllable polarizing element, a controllable polarization transformer followed by a fixed polarizing element.

Claim 35. (previously presented): A system for optical information transmission as claimed in claim 34, further comprising, in the controllable polarization transformer, an input-side polarization transformer suitable for PMD compensation followed by an output-side polarization transformer.

Claim 36. (previously presented): A system for optical information transmission as claimed in claim 32, further comprising a phase-difference-modulating device for producing differential phase modulation between the optical signal elements.

Claim 37. (previously presented): A system for optical information transmission as claimed in claim 36, wherein the differential phase modulation is produced such that the input-side control signal is designed to be at least approximately independent of a steady-state difference phase angle between the optical signal elements.

Claim 38. (previously presented): A system for optical information transmission as claimed in claim 36, further comprising a transmission laser and a transmission-end power splitter, wherein the phase-difference modulating device produces frequency modulation on the transmission laser, and produces the differential phase modulation between the optical signal elements based on a magnitude of any delay time difference between a splitting of an optical signal from the transmission laser in the transmission-end power splitter and combination with orthogonal polarizations of the optical signal elements formed in this way.

Claim 39. (previously presented): A system for optical information transmission as claimed in claim 32, further comprising at least one photo detector following the controllable polarizing element, wherein a signal component which is emitted on the output side of the controllable polarizing element is supplied to an input side of the at least one photo detector, the at least one photo detector producing at least one detected signal in which the interference is manifested.

Claim 40. (previously presented): A system for optical information transmission as claimed in claim 39, further comprising a filter in the at least one signal processing module for passing at least one spectral signal element of at least one signal which can be processed and is produced from the at least one detected signal.

Claim 41. (previously presented): A system for optical information transmission as claimed in claim 39, further comprising a detector in the at least one signal processing module which at least partially provides the input-side control signal which is one of a linear function and a splitter root function of at least one second-order moment of at least one spectral signal element.

Claim 42. (previously presented): A system for optical information transmission as claimed in claim 41, wherein the detector produces a second-order moment, which is in mixed form, of two different spectral signal elements.

Claim 43. (previously presented): A system for optical information transmission as claimed in claim 41, wherein the detector produces a second-order moment of a spectral component which is a measure of power of the spectral component.

Claim 44. (previously presented): A system for optical information transmission as claimed in claim 40, wherein the filter passes a Fourier coefficient of a signal, which can be processed, as a spectral signal element, in which case delay time compensation can be effected before formation of second moments in mixed form.

Claim 45. (previously presented): A system for optical information transmission as claimed in claim 40, wherein the at least one signal processing module processes the at least one detected signal and emits an output-side control signal which drives an output-side polarization transformer in the controllable polarizing element.

Claim 46. (previously presented): A system for optical information transmission as claimed in claim 40, further comprising a correlating element in the at least one signal processing module, the correlating element for correlating the at least one detected signal with at least one spectral component of at least one data output signal, and for emitting a correlation signal which can be processed, such that the at least one signal processing module processes the correlation

signal and emits an output-side control signal for driving an input-side polarization transformer in the controllable polarizing element.

Claim 47. (currently amended): A method for optical information transmission using differently polarized optical signal elements, the method comprising the steps of:

emitting at least one of the optical signal elements via an output side of a controllable polarizing element;

detecting any polarization multiplex interference which occurs between the optical signal elements;

forming at least one control signal from the detection via at least one signal processing module; and

using the at least one control signal to control the controllable polarizing element.

Claim 48. (previously presented): A method for optical information transmission as claimed in claim 47, the method further comprising the steps of:

supplying at least one input-side control signal for a regulator to an input of the regulator; and

emitting at least one output-side control signal from the regulator and supplying the at least one output-side control signal to the controllable polarizing element.

Claim 49. (previously presented): A method for optical information transmission as claimed in claim 47, wherein the controllable polarizing element is a fixed polarizing element with a controllable polarization transformer following it.

Claim 50. (previously presented): A method for optical information transmission as claimed in claim 49, wherein the controllable polarizing transformer is suitable for PMD compensation and has a downstream output-side polarization transformer.

Claim 51. (previously presented): A method for optical information transmission as claimed in claim 48, the method further comprising the step of producing differential phase modulation between the optical signal elements.

Claim 52. (previously presented): A method for optical information transmission as claimed in claim 51, wherein the differential phase modulation is produced at a start of information transmission.

Claim 53. (previously presented): A method for optical information transmission as claimed in claim 52, wherein the differential phase modulation is effected such that the input-side control signal is formed at least approximately independently of any steady-state difference phase angle between the optical signal elements.

Claim 54. (previously presented): A method for optical information transmission as claimed in claim 51, the method further comprising the step of producing frequency modulation for a transmission laser, the frequency modulation producing the differential phase modulation between the optical signal elements based on a magnitude of any delay time difference between a splitting of an optical signal from the transmission laser in a transmission-end power splitter in combination with orthogonal polarizations of the optical signal elements formed in this way.

Claim 55. (previously presented): A method for optical information transmission as claimed in claim 48, wherein the controllable polarizing element, which emits at least one signal component, is followed by at least one photodetector for each signal component, the at least one photodetector producing a detected signal in which the interference is manifested.

Claim 56. (previously presented): A method for optical information transmission as claimed in claim 55, the method further comprising the step of passing at least one spectral signal element of at least one signal, which can be processed and is produced from the detected signal, by a filter.

Claim 57. (previously presented): A method for optical information transmission as claimed in claim 55, the method further comprising the step of supplying the input-side control signal at least partially to a detector which forms the input-side control signal such that it is at least approximately one of a linear function and a square root function of at least one second-order moment of at least one spectral signal element.

Claim 58. (previously presented): A method for optical information transmission as claimed in claim 57, the method further comprising the step of producing, by the detector, a second-order moment, in mixed form, from two different spectral signal elements.

Claim 59. (previously presented): A method for optical information transmission as claimed in claim 57, the method further comprising the step of producing, by the detector, a second-order moment of a spectral component, the second-order moment being a measure of power of the spectral component.

Claim 60. (previously presented): A method for optical information transmission as claimed in claim 56, wherein a Fourier coefficient of the at least one signal is used as the spectral signal element of the detected signal with delay time compensation being effected before formation of second moments in mixed form.

Claim 61. (previously presented): A method for optical information transmission as claimed in claim 56, wherein the detected signal, via the signal processing module, emits an output-side control signal for driving an output-side polarization transformer in the controllable polarizing element.

Claim 62. (previously presented): A method for optical information transmission as claimed in claim 56, the method further comprising the steps of:

correlating the detected signal via a correlating element in the at least one signal processing module, with at least one spectral component of at least one data output signal;

processing the correlation signal, which is produced during the correlation process, by the at least one signal processing module; and

driving an input-side polarization transformer in the controllable polarizing element via an output-side control signal which is produced during the processing.